# Green Remediation:
# Army Policy and Implementation

**11 March 2009**

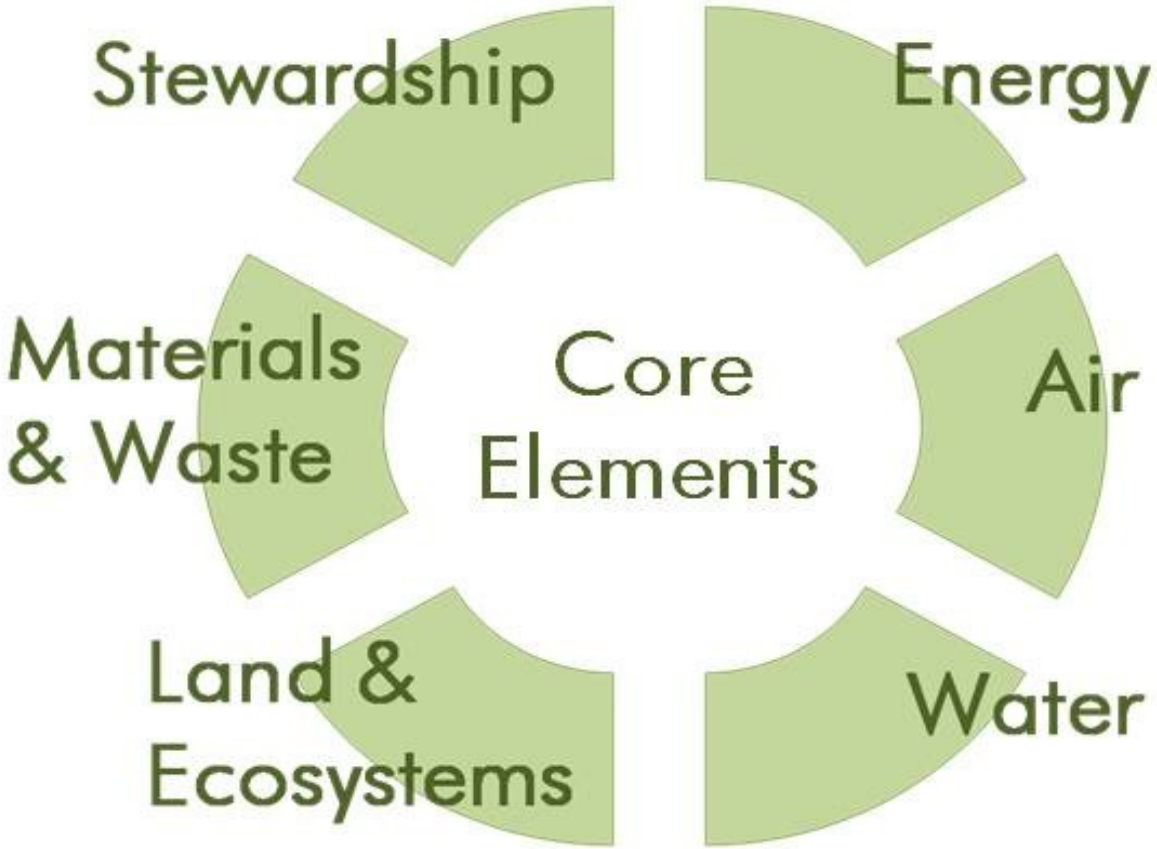
# Agenda

- What is Green Remediation?
- Overview of Headquarters Efforts
  - EPA Efforts
  - DoD Efforts
  - HQ Army Efforts
- USACE Decision Framework
  - Background and Structure
  - When and How
  - Incorporation Strategies – Current and Future
  - Path Forward

# What is Green Remediation?

***Green Remediation*** *- The practice of considering all environmental effects of a remediation strategy (i.e., the remedy selected and the implementation approach) early in the process, and incorporating options to maximize the overall environmental benefit of cleanup actions*

# What is Green Remediation?



# Green Approaches in Cleanup &

**Deconstruction, Demolition, and Removal**

- Reuse/recycle deconstruction and demolition materials
- Reuse materials on site whenever possible
- Consider future site use and reuse existing infrastructure
- Preserve/Reuse Historic Buildings
- Use clean diesel and low sulfur fuels in equipment and noise controls for power generation
- Retain native vegetation and soils, wherever possible
- Protect water resources from runoff and contamination

**Cleanup, Remediation, and Waste Management**

- Power machinery and equipment using clean fuels
- Use renewable energy sources, such as solar, wind, and methane to power remediation activities
- Improve energy efficiency of chosen remediation strategies
- Select remediation approaches, such as phytoremediation, that reduce resource use and impact on air, water, adjacent lands, and public health
- Employ remediation practices that can restore soil health and ecosystems and, in some cases, sequester carbon through soil amendments and vegetation

**Design and Construction for Reuse**

- Use Energy Star, LEED, and GreenScapes principles in both new and existing buildings
- Reduce environmental impact by reusing existing structures and recycling industrial materials
- Incorporate natural systems to manage stormwater, like green roofs, landscaped swales, and wetlands
- Incorporate Smart Growth principles that promote more balanced land uses, walkable neighborhoods, and open space
- Create ecological enhancements to promote biodiversity and provide wildlife habitat and recreation

**Sustainable Use and Long Term Stewardship**

- Reduce use of toxic materials in manufacturing, maintenance, and use of buildings and land
- Minimize waste generation, manage waste properly, and recycle materials used/generated
- Maintain engineering and institutional controls on site where waste is left in place
- Reduce water use by incorporating water efficient systems and use native vegetation to limit irrigation
- Maximize energy efficiency and increase use of renewable energy
- Take appropriate steps to prevent (re)contamination

# EPA Green Remediation Efforts

- Documenting state-of-the-art Best Management Practices (BMPs)
- Identifying emergent opportunities
- Establishing a community of practitioners
- Developing mechanisms and tools
- Partnering with state and local agencies / organizations
- Exploring options for a green remediation evaluation / verification system
- Baseline analyses, metrics
- MOUs (DOE-NERL, USACE)
- Superfund Green Remediation Work Group

# DoD Green Remediation Efforts

- DUSD(I&E)/EM is developing a policy memo to encourage Military Components to take action to learn more about green remediation and consider green remediation in current and future remedial activities
- DoD will not re-open RODs or other decisions and agreements that may already be in place or under negotiation, but rather consider options when and where they make sense to the Military Components

# DoD Green Remediation Efforts

- Initial focus appears to be on learning about efforts underway by the Services to implement green remediation opportunities :
  - Preserving natural resources
  - Minimizing energy use and increasing energy efficiency
  - Minimizing carbon dioxide emissions
  - Managing and minimizing toxics
  - Improving water quality
  - Maximizing recycling and reuse of materials
  - Minimizing the overall footprint of the remedial system

# HQ Army Green Remediation Efforts

- Including green remediation into FY2010-2011 Army Environmental Cleanup Strategic Plan
  - Incorporate best management practices that help to decrease the demand placed on the environment during remedial action operation and minimize the potential for collateral environmental damage
  - Emphasis mirrors the focus of OSD
- Supporting OSD's efforts to develop comprehensive DoD green remediation policy
- Developing Army-specific guidance

# HQ Army Green Remediation Efforts

- Work to expand existing Army sustainability efforts to include environmental remediation
- Review of the USACE Decision Framework for Incorporation of Sustainability into Army Environmental Remediation

# USACE Decision Framework

- Purpose: To provide a roadmap for Army project teams and contractors to incorporate sustainability throughout the complete cleanup process
- Sustainable (USACE decision framework) vs green remediation (OSD policy)? Green remediation can be the same or a subset of the larger incorporation of sustainability practices into remediation. For presentation here – synonymous.

# Overview of Presentation

- Background and Structure of Army Decision Framework
- When and How
- Incorporation Strategies – Current and Future
- Path Forward

# Guidance Structure and

- Decision flow chart, step directions, and on-line resources.
- Starts with platforms that are inherently sustainable
- Covers complete remediation process
  - Planning
  - Investigation
  - Remedy Selection
  - Remedy Implementation
  - Remedy Operation and Maintenance
  - Site Closeout

# Platforms

- Planning – Technical Project Planning (TPP)
- Investigation- TRIAD
- Remedy Selection – National Contingency Plan (NCP)
- Remedy Design – Value Engineering Studies
- Remedy Construction – Green Remediation Best Management Practices
- Remedy Operation and Maintenance – Remedial System Evaluations
- Site Closeout – Army Waste Minimization Policy and Guidance

# TPP – Project Direction

- Corps Engineering Manual (EM 200-1-2), 31 August 98
- Team Members
  - Regulators
  - Public
  - Customer
  - Relevant technical disciplines
- Inherent sustainability in TPP
  - project planning through site closeout, including site reuse
  - Inclusion of all stakeholders

# TPP Core Questions

**Can/Should Sustainability Be Incorporated**?

- Contract allows?
- Staffing adequate?
- Funding available?
- Schedule allows?
- Scope justifies?

# Contract Considerations – Can Sustainability Be Incorporated

| Contract type | Existing | Future |
|---|---|---|
| Fixed Price | Yes | Yes |
| Cost Reimbursement | Yes | Yes |
| Performance Based | Cost –effective sustainability measures, i.e. energy conservation | Yes |

# Contractual Mechanisms – How to Make Sustainability Performance-Based

- Performance incentive – a percentage of contract
- In proposal submittals, contractor
  - Identifies resources for sustainability incorporation
  - The amount each resource will be incorporated
  - The weighting for each resource within the overall incentive
- Contract awarded on technical merit, sustainability incorporation one evaluation criteria
- Contractor awarded portion of incentive based on % of sustainability actually incorporated.

# Example

- Identification of resources and sustainability incorporation in proposal
  - Water – 30% use of non-potable drinking water
  - Energy – 30% of total energy renewable energy
  - Waste minimization – 65% diversion
- Incentive calculation
  - 0.25 water + 0.5 energy + 0.25 waste (weighting factors could be supplied by the government in SOW)
  - Assume contractor achieves 20% non-potable water use, 25% total energy renewable, 50% waste diversion
  - % incentive awarded= 78%

# TPP - Can Sustainability Be Incorporated?

- Adequate Funds?
  - Minimal funds in identification (review contractor proposal)
  - Can use option for implementation if funds uncertain
  - On-going projects - cost effective procedures can be suggested
- Adequate Staffing?
  - Knowledge and time to review technical merit of sustainability in proposal
  - Oversight of sustainability implementation and approval of performance – part of general contract oversight
- Schedule allows?
  - Existing contracts and on-going activities may not allow.
  - New contracts – no expected schedule limitations as sustainability incorporated into proposal submittal process.

# TPP - Should Sustainability Be Incorporated?

- Does scope of project merit a sustainability evaluation?
  - Small?
  - Routine?
- Even if small or routine, can incorporate sustainability through rules of thumb. Examples:
  - Energy-saving sheds
  - Reuse of equipment/buildings
  - Use of native plants for landscaping
  - Recycling

# Summary: TPP – Can/Should Sustainability Be Incorporated?

- New Contracts – Incorporation of sustainability generally not limited
  - Limited staff, fund, schedule demands in identification
  - Options for implementation if funds uncertain
  - Small scale, routine projects can incorporate on reduced effort based on rules of thumb
- Existing Contracts – Sustainability incorporation may be limited
  - Performance-based contracts – some limitation ( cost-saving measures)
  - Other contracts (fixed price, cost reimbursement) not limited

# TPP
# Identification of Information

- Site information worksheet - Identify needs specific to sustainability
- Examples:
  - Reuse of existing equipment/buildings?
  - In-situ technologies data collection, both active and passive
  - Reuse of waste streams?
  - Design optimization?
  - Operation and maintenance optimization?
- Needs translated to data needs worksheets (risk, remedy, compliance, and responsibility)

# Site Investigation - TRIAD

- Expand data needs to collect information identified in TPP
- Inherent sustainability in TRIAD
  - Decrease in uncertainty through better characterization-remedy more efficient
  - Use of real-time field investigative tools – less energy intensive, less waste
- Current approach – additional questions to consider sustainability in performing the site investigation
  - Passive sampling devices?
  - Drive point devices vs. permanent wells?
- Future approach – use of long-term monitoring optimization tools that incorporate sustainable considerations to compare sustainability of investigation options

# Remedy Selection - NCP Criteria

- Current approach – incorporate sustainable evaluation into nine criteria
  - Air emissions- human health and environment
  - Human work risk – short term effectiveness
  - Waste minimization – reduction of toxicity, mobility, or volume through treatment
  - Implementability and Cost – use of natural resources (water, energy sources)
  - Public opinion – green spaces, contribution to community
- Future approach- technology sustainability evaluation tool (tools in development- waiting for one that is standard, complete, available, affordable)

# Remedy Implementation: Design - Value Engineering

- Include many sustainability aspects
  - Recycling
  - Use of existing infrastructures and materials
  - Enhancement of remedies to promote ecological well-being
  - Cost reduction
  - Risk reduction
  - Reduction of site close-out time
  - Reduced resource consumption
  - Life-cycle costs
- Current approach – include VE study (or abbreviated VE design checklist) in project planning and contracts
- Future: Identify additional sustainability aspects, e.g. greenhouse gas emissions, in VE studies and design checklists

# Remedy Implementation – Construction

## Green Remediation Best Management Practices

- Reference EPA Green Remediation Primer and State of Illinois: Greener Cleanups Tool: How to Maximize the Environmental Benefits of Site Remediation
- Examples:
  - Capture/reuse grey water
  - Impose restrictions on idling of machinery
  - Recycling/reuse of waste and debris
  - Abandonment rather than remove subsurface structures

# Operation and Maintenance - Remediation System

- Include many sustainability aspects
  - Cost reduction
  - Risk reduction
  - Site close-out time
  - Optimization of equipment operation and maintenance
  - Resource (energy, water) consumption
- Current approach – incorporate RSE or equivalent process into the site remediation process
- Future approach – current approach with the addition of air emissions evaluation and recommendations to reduce.

# Site Closeout

- Army policy  (USACE Engineering and Construction Bulletin No. 2008-14, April 2008) – Minimum of 50% waste diversion
- Studies show that this amount is cost effective.
- Current approach – use Army criteria as minimum
- Future approach
  - Site specific evaluation – more waste may be diverted
  - Incorporate green space, ecologically friendly practices, community reuse of site

# Summary – Current Approach

- Use of existing Army platforms to incorporate significant sustainability
- Augmentation of platforms with specific sustainability “rules of thumb”.
- Waiting for development of sustainability evaluation tools for stand-alone evaluation of remedial options on sustainability.

# Future Approach

- Use newly developed sustainability evaluation tools.
- Score remedial options using modified EMS evaluation factors.
  - Mission Impact
  - Regulatory Impact
  - Environmental Impact (Sustainability)
  - Community Concern

# Future Approach - Modified EMS Scoring Matrix

## Use on Any Remedial Phase to Compare Options

- Mission Impact, Regulatory Impact – Threshold criteria (need to meet to continue consideration)
- Community Concern and Environmental Impact (Sustainability) – Balancing criteria
- Different weighting factors for each criteria can be used to represent relative importance.

| Threshold Criteria | Rating Scale | | Activity Level High 4 | Medium 3 | Low 2 | Rare 1 |
|---|---|---|---|---|---|---|
| Mission Impact | Enhances mission | 4 | 16 | 12 | 8 | 4 |
| | Compatible with mission | 3 | 12 | 9 | 6 | 3 |
| | Neutral | 2 | 8 | 6 | 4 | 2 |
| | Some obstacles | 1 | 4 | 3 | 2 | 1 |
| | Significant negative impact | 0 | 0 | 0 | 0 | 0 |
| Regulatory Impact | No regulatory constraint | 4 | 16 | 12 | 8 | 4 |
| | Preferred regulatory practice | 3 | 12 | 9 | 6 | 3 |
| | Accepted regulatory practice | 2 | 8 | 6 | 4 | 2 |
| | To be regulated | 1 | 4 | 3 | 2 | 1 |
| | Not permitted | 0 | 0 | 0 | 0 | 0 |

| Balancing Criteria | Rating Scale | | Activity Level High 4 | Medium 3 | Low 2 | Rare 1 |
|---|---|---|---|---|---|---|
| Community Concern | Incentives for inclusion | 4 | 16 | 12 | 8 | 4 |
| | Strongly in favor | 3 | 12 | 9 | 6 | 3 |
| | Mildly in favor | 2 | 8 | 6 | 4 | 2 |
| | No interest | 1 | 4 | 3 | 2 | 1 |
| | Against | 0 | 0 | 0 | 0 | 0 |
| Environmental Impact | High, beneficial | 4 | 16 | 12 | 8 | 4 |
| | Moderate, beneficial | 3 | 12 | 9 | 6 | 3 |
| | Low | 2 | 8 | 6 | 4 | 2 |
| | No impact | 1 | 4 | 3 | 2 | 1 |
| | Significant negative impact | 0 | 0 | 0 | 0 | 0 |

# Summary

- Existing platforms incorporate significant sustainability
- Platforms except for the NCP and Waste Minimization are optional.
- Incorporation of sustainability could be significantly increased through use of the existing platforms
- Incorporation of sustainability is generally not limited by funds, personnel, schedule, and contract mechanism; however, the level of sustainability incorporation will vary depending on the resources.
- Tools for sustainability incorporation still in development – standard, cost-effective, complete, and available tools necessary for full incorporation.
- When tools available, a modified EMS scoring matrix can be used to weight sustainability with other decision-making factors.

# Path Forward

- Draft decision framework completed February 2009, in internal review.
- Peer and Corps/Army Headquarters review, May 2009; finalization of decision framework December 2009.

# Questions?

Call (402) 697-2582